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Preparing to respond Joint Trauma Training Center and USAF Nursing Warskills Simulation Laboratory

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From supporting medical efforts in humanitarian and disaster situations to dealing with the aftermath of terrorist attacks, military nurses must be prepared to answer the call. A primary mission of military medical personnel is to treat combat injuries at the point of wounding and return personnel to duty as quickly as possible. Those who cannot be returned to duty must be protected and treated to prevent loss of life and limb. Despite three trauma centers in the DoD, there is limited opportunity to expose active duty medical personnel to trauma patients with the type of injuries seen on the battlefield, for example, penetrating injuries from missiles, bullets from small arms, and fragments from explosive munitions [1]. This article describes two training and research initiatives designed to prepare and evaluate military nurses readiness to respond; the Joint Trauma Training Center (JTTC) and the Readiness of US Air Force Nurses study using the Warskills Simulation Laboratory.

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Joint Trauma Training Center

The Government Accounting Office and DoD reports on medical operations during the Gulf War questioned the military's ability to provide trauma care to the predicted number of casualties [2]. Legislation enacted in 1996 required the DoD to implement a demonstration program that would provide trauma care training for military medical personnel [3].

This pilot program was conceived to improve the combat medical skills and experience of entire Army, Navy, and Air Force surgical trauma teams at a premier civilian trauma center, Ben Taub General Hospital (BTGH) in Houston, Texas. The Mission of the Joint Trauma Training Center is to provide Military Trauma Training Teams with high volume, real trauma treatment experience that can only be achieved at an inner city, Level 1 Trauma Center, in order to enhance combat trauma skills and medical readiness. Typically, military medical staff prepares for combat, disaster, or humanitarian situations by participating in simulated exercises. At the JTTC, military trauma team members gained real world experience. The goal was to maximize their trauma training experience and to challenge their abilities to perform in a highly stressful trauma environment

A trauma center must see at least 650 cases per year with an injury severity score (ISS) of more than 15 to achieve the best outcomes [4]. Currently there are two American College of Surgeons (ACS) designated level 1 trauma centers and only one ACS

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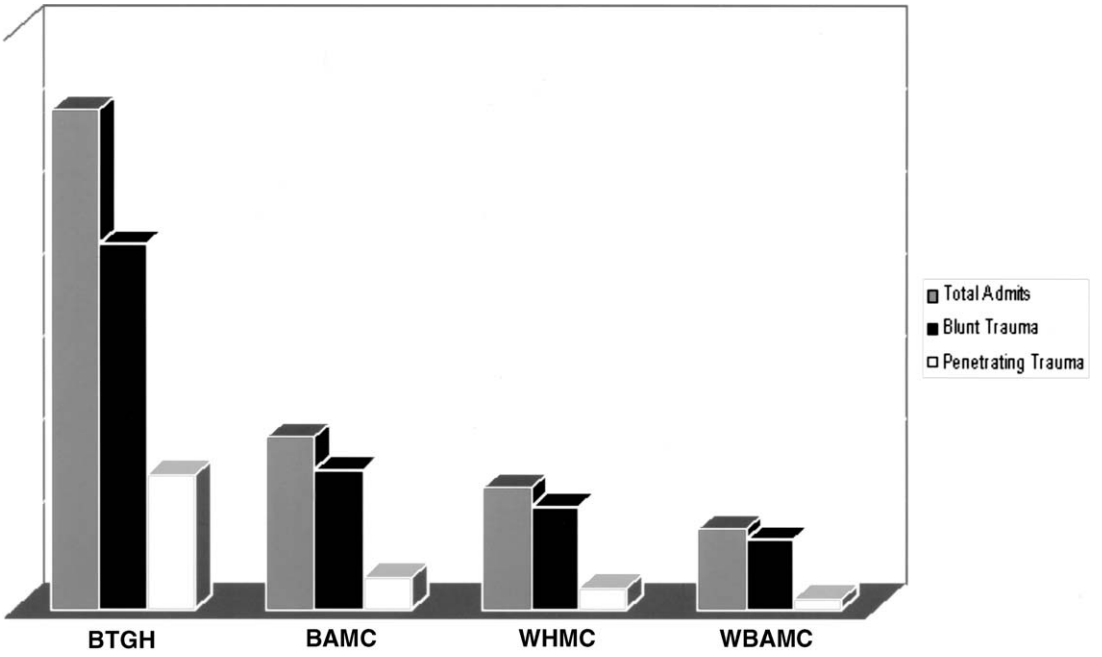

Fig. 1. Comparison of the total number of trauma admissions, blunt and penetrating injuries seen annually among Ben Taub General Hospital (BTGH), Brooke Army Medical Center (BAMC), Wilford Hall USAF Medical Center (WHMC), and William Beaumont Army Medical Center (WBAMC).

designated level 2 trauma center in the DoD. All three facilities meet 650 case threshold; however, to be able to provide an intense trauma immersion, the volume of trauma patients at any DoD trauma center compares poorly with high volume, inner city hospitals. The volume and the severity of injury seen at BTGH far exceeded the numbers seen at all three DoD trauma centers combined (Fig. 1).

The military trauma team rotation

The composition of the Tri-Service faculty (Table 1) who facilitated the course mirrored that of the military trauma team (MTT). The faculty was responsible for the coordination of training, classroom instruction, clinical facilitation, and liaison to BTGH staff. The faculty, who worked along side the BTGH staff in the operating room, the emergency center, the surgical intensive care unit, and the anesthesia department, laid the foundation for the acceptance and support that BTGH personnel provided the military rotating teams.

Army, Navy, and Air Force military units sent their respective MTT members for 28-day rotations to the JTTC. While assigned to a rotation at BTGH, the MTT members were called "rotators" and worked 12 to 14 hour shifts, 5 days a week. In addition, Air Force critical care air transport teams (CCATT) rotated to BTGH simultaneously with the MTTs. These members worked primarily in the trauma surgical intensive care unit (TSICU).

The clinical experiences for the rotators were as similar to treating wartime trauma casualties as can be expected in a peacetime medical facility. Personnel experienced the entire continuum of trauma care, beginning with the Houston Fire Department emergency medical system (EMS) and extending through the emergency center, the operating room, and the TSICU.

Program design

The JTTC program combined faculty guided clinical experience, cutting edge trauma lectures, cognitive testing, skills and simulation laboratories, and multidisciplinary case presentations. Rotating members were integrated into their respective specialty area or unit assignment, guided by JTTC faculty. All didactic activities were team centered, starting with the multidisciplinary case reviews, which included rotator led case presentations facilitated by JTTC faculty and clinical/tactical case reviews. The clinical/tactical case review entailed a case presentation in

Table 1
JTTC faculty and Military Trauma Team composition

Program faculty	Military trauma team
General and orthopedic surgeons	General and orthopedic surgeons
Pulmonary intensivist	Nurse anesthetists
	Perioperative nurses
Nurse anesthetists	Emergency room nurses
Perioperative nurse	Critical care nurses
Emergency room nurse	Licensed vocational nurses
Critical care nurse	Administrator
Nurse educator	Emergency medical technicians (EMTs)
Administrator	Critical care air transport team:
Emergency medical technicians (EMTs)	Physician
	Critical care nurse
	Respiratory therapist

which the MTT considered the same process but in a deployed setting (ie, in a field hospital tent).

The next component was a multidisciplinary trauma lecture series, which covered the latest trauma care concepts, such as "damage control surgery," and "hypotensive trauma resuscitation." The final component of the JTTC was the specialty specific training. This component encompassed individual and group in-service training based on identified needs; emergency medical technician (EMT) refresher training; trauma skills laboratories, which included practice on actual equipment used in the military field setting; and simulation sessions using the human patient simulator (HPS) and real event based trauma scenarios.

Trauma training requires exposure and volume. The emergency center (EC) at BTGH treats more than 130,000 patients annually with 3000 surgical admissions per year (250 per month). In the EC, shock room patients are triaged and stabilized. The volume, pace, and austere care environment in the EC parallels the arrival and stabilization of a patient during combat. Initially the focus for rotators was orientation and skill refresher training to integrate the rotating nurse and medical technician into the "shock room" team (Fig. 2). Working with BTGH EC staff, they performed initial management of the trauma patient and assisted with stabilization. Military EMTs performed a wide range of procedures from starting IVs to assisting with diagnostic peritoneal lavage (DPL) and hemorrhage control. In addition, the Houston EMS offered military EMTs the opportunity to observe and participate in first responder duties. This treatment of the trauma patient in the field was extended into the EC, which parallels the wartime mission of stabilization and medical evacuation efforts.

Anesthetists, operating room nurses, and technicians were exposed to a large volume of trauma patients and developed the skills to manage casualties at an accelerated pace. Orientation to the initial management of the operating room environment was quick, and independence was achieved rapidly. Nurses and operating room technicians assisted the surgeons and also performed circulating duties. Anesthesia care included emergency airway intervention, draw-over anesthesia techniques, vascular access, fluid administration, intraoperative care, special procedures, and postoperative surgical care. Surgeons integrated into the BTGH surgery teams, which allowed them to hone their trauma surgery skills. It also afforded the physicians the opportunity to become accustomed to their role as the MTT commander.

The TSICU is a 30-bed general and thoracic surgical service. The unit received 29% of all EC trauma admissions. Admission criteria included respiratory compromise, hemodynamic instability, or neurologic instability. Clinical experiences included ventilator management, hemodynamic monitoring, vasoactive medication therapy, and traumatic and postoperative wound management. Typically one to two registered nurses, one to three licensed vocational nurses or medical technicians, and a respiratory therapy technician rotated monthly (Fig. 3).

JTTC simulation center

The most innovative aspect of the JTTC was the use of military focused trauma resuscitation scenarios and a state-of-the-art HPS model (Medical Education Technologies, Sarasota, FL), which provided a realistic representation of the types of casualties expected during various contingencies. The HPS exhibits physiologic responses that make

Fig. 2. Military trauma team members treating a patient in the EC shock room.

one forget that it is not a real person. Examples of some of the capabilities of the HPS are outlined in Table 2. By focusing on specific clinical scenarios in a controlled environment, this technology allowed trauma team members to practice and hone their critical assessment, decision-making, and psychomotor skills and provided the faculty a means to evaluate performance.

In the first of three sessions, rotators were brought in "cold" and presented with a scenario requiring

Fig. 3. Military trauma teams members performing a celiotomy at the bedside in the TSICU.

their intervention. This session was videotaped and participants critiqued their performance. A weighted assessment tool was used to evaluate team performance. The next session, which was scheduled midway through the rotation, exposed participants to various trauma scenarios and polytrauma patients and interventions that are military environment based. At the end of their rotation, rotators were evaluated again using trauma scenarios and the HPS mannequin. They reviewed their first and last videotapes and compared their performance. Participants actually witnessed the improvements in their performance. The participant evaluations of the simulator experience were overwhelmingly positive.

Program outcomes

All the groups demonstrated growth after their JTTC experience. The overall group mean scores on pretests and posttests improved from 59% to 68% ($P < 0.000$). Rotators recorded the type and number of skills, procedures, patient management, and processes performed and their comfort levels. For example, the monthly average number of trauma patients treated by nurse anesthetists deployed to the JTTC was 28.43, as opposed to only 0.10 patients seen at their home station in the month prior to their deployment. For medics, the average number of trauma patients seen at JTTC in 1 month was 96, compared to 0.5 patients seen at their home station 1 month prior to their JTTC experience. Entry and exit surveys were also conducted with positive growth noted in the rotators' confidence levels.

JTTC faculty also studied simulation session outcomes [5]. The performance of ten three-person teams were examined using a human performance assessment tool that included five scored and eight timed tasks universally accepted as critical to the initial assessment and treatment of a trauma patient. Scored tasks included organizational skills in addition to airway, breathing, circulation, and disability assessments. The timed tasks included time to oxygen administration, auscultation, pneumothorax recognition and decompression, external hemorrhage control, airway control and intubation, and finally

Table 2
Capabilities of human patient simulator

Skill/management issue	Example
Assess complete vital signs	Heart sounds, pulses, noninvasive blood pressure monitoring, lung sounds, and respiration and pupillary reaction. Use of a sphygmomanometer to determine BP using return flow technique. Adjustable pulse threshold (eg, radial absent for mean arterial pressure < 60 mm Hg/SBP < 80 mm Hg).
Pulmonary assessment	Lung sounds, asymmetric breath sounds, airway compromise, abnormal breath sounds (wheezes, rhonchi, crackles)
Airway patency	Airway obstruction, tongue swelling, laryngospasm
Ventilator/airway management	Direct laryngoscopy for intubation; esophageal intubation as indicated by absent breath sounds and gastric distention; three ventilator modes; physiologically correct response to mechanical ventilation. Alteration in airway resistance and lung compliance; ''fighting'' and triggering the ventilator; asymmetric breath sounds indicating tube malposition; normal/abnormal breathe sounds.
Treat shock	Simulates shock (anaphylactic, cardiogenic, hemorrhagic) and physiologic response to treatment
Perform neurologic assessment	Simulates increased intracranial pressure and accompanying physical signs (altered pupillary response, heart rate, blood pressure)
Advanced cardiac life support	Effectiveness of chest compressions reflected by end-tidal CO_2 production; transcutaneous pacing with adjustment of responsiveness to capture; effectiveness of ventilation demonstrated by end-tidal CO_2. Responds to administration of supplemental oxygen.
Burns, chemical injuries	Use of moulage specifically designed for the human patient simulator allows for simulation of all burns/chemical injuries.

disposition of the patient. All ten groups demonstrated significant improvement in the five scored ($P \leq 0.05$) and six of the eight timed tasks ($P \leq 0.05$) during the final scenario (Fig. 4). This improvement reflects the teams' cumulative didactic and clinical experience at the JTTC and some degree of simulator familiarization. Improved final scores reflect efficient and coordinated team efforts.

The teams were exposed to large volumes of trauma patients, allowing team members to work side by side with their commander, who also came to know his or her team's capabilities. Individual benefits included trauma-nursing skills development and exposure to advanced trauma care concepts in a practice setting. The ''intangibles'' of the program involved the acceptance of the trauma team role, increased confidence in individual and team skills, and development of a phenomenon we called the ''trauma attitude.'' We described this as evolving from physically and emotionally reacting to the shock of seeing severe injuries, especially in young patients. This transformation or desensitization to the shock value, allowed the individual to react quickly and focus on the resuscitation effort as a team member. One member commented that at first he was saying to himself, ''Oh, my God, that's a gunshot wound!'' to ''OK, that's a gunshot wound, now let's treat it.'' These changes were noted after about 2 weeks into the rotation and were clearly evident by the rotation's end.

JTTC discussion

The JTTC trained more than 320 military personnel from Army Forward Surgical Teams, Navy Fleet Surgical Teams, Air Force CCATT and Expeditionary Medical Support Teams, as well as Special Operations medics and Army Rangers. These teams are now prepared and confident. A typical comment was ''After this experience, we can do anything!'' Furthermore, the JTTC template, based on a civilian-military partnership, has been adapted by the three medical services. The Air Force opened the Center for Trauma Skills and Readiness (C-STARS) in Baltimore, Maryland and the Army has implemented the Army Trauma Training Center in Miami, Florida, and the Navy is developing the Navy Trauma Training Program in Los Angeles, California.

Readiness of US Air Force nurses study

For more than 2.5 years the nurses at the US Air Force 59th Medical Wing (Wilford Hall Medical

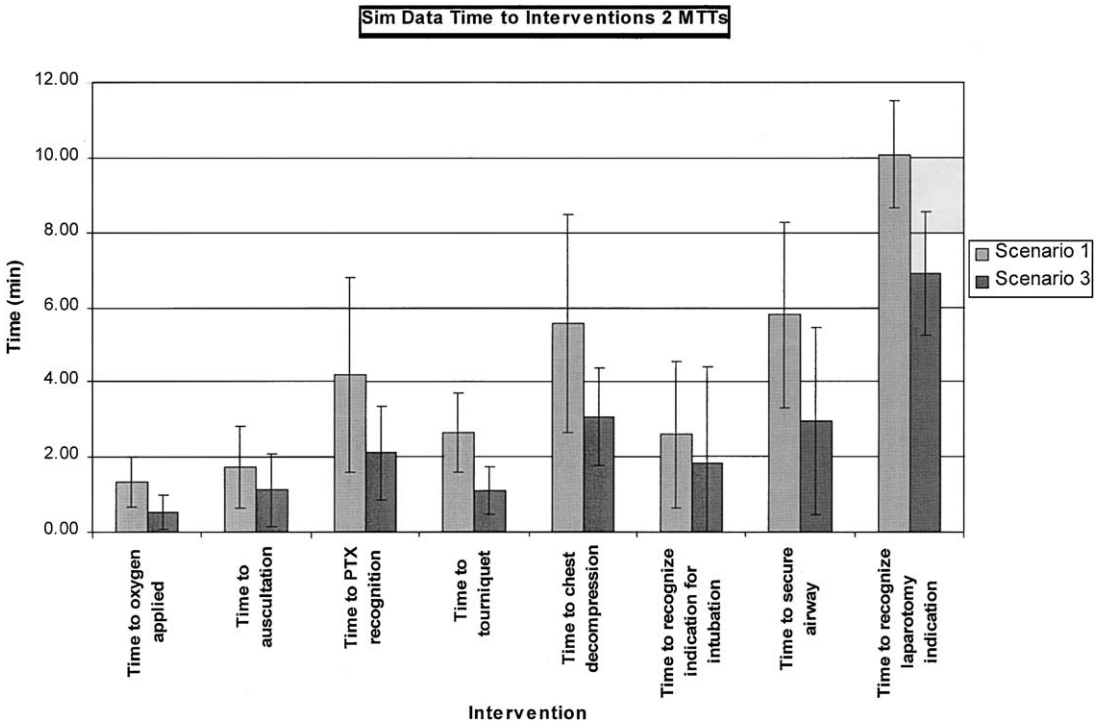

Fig. 4. Differences in time for initiation of eight timed interventions during pretraining and posttraining simulations for two military teams.

Center) in San Antonio, Texas, have been preparing to respond to any contingency, from peacetime humanitarian crises to war. The research for the readiness study consisted of training and evaluation in a state-of-the-art simulation laboratory, completion of a cognitive examination, and self-assessment. The purpose of the research was to evaluate the sustainment of the skills acquired during this training and determine if there was a relationship between demographic variables (eg, years of experience, unit of assignment, education, deployment history) and performance on a cognitive examination and in the simulation laboratory and the nurses self-assessment of their confidence and ability to perform the required competencies.

Training and evaluation scenarios

During the training phase of the study, 156 medical surgical nurses completed a 3-hour simulation laboratory focused on the development of critical thinking skills and standardization of care for acutely injured individuals in a military unique environment. For each scenario, a standardized set of instructions was presented. The nurses were told they were assigned to a 10-bed field facility and were working in the triage/general admissions area. A physician was available to them for consultation but was not available to assist with direct care. The unit control center (UCC), which coordinates all patient movement, was available by walkie-talkie. The nurses were directed to assess the patient and plan, implement, and evaluate a plan of care. The nurses had to provide a triage category with rationale, to specify when the patient was ready for discharge or transfer, and to state the patient's trajectory and rationale for the decision (eg, evacuation or return to duty). The instructor queried the participants at appropriate times to ensure that this patient management information was presented (eg, "The UCC wants to know your patient's triage category and when he'll be ready to move").

The scenarios used for training and evaluation included care of patients with airway compromise, orthopedic injuries, spinal cord injuries, bomb blast injuries, hemorrhagic shock, and burn trauma. These scenarios were selected based on a literature review regarding the most commonly experienced battle injuries in wartime and military operations other than

Table 3
Simulation laboratory training/evaluation scenarios

Scenario	Objectives
Anaphylactic shock: A soldier presents with impending anaphylactic shock after being stung by a bee.	This scenario introduces the nurses to the simulator lab and Stan to gain experience using various pieces of equipment (eg, PT LOX [liquid oxygen], Lifepak 12 monitor) and supplies and to focus on a systematic method for evaluating and caring for patients. This scenario reinforced the ABCs of patient care (airway, breathing, and circulation) and is applicable to chemical-biologic scenarios in which patient may present with airway compromise.
Ankle/Head Man: A paratrooper with an ankle fracture with a loss of pulse and a head injury with deteriorating mental status.	This patient reinforced the need for a systematic evaluation and to handle multiple complex problems simultaneously.
Hemorrhage Man: An airman pulled from under a collapsed building that had been bombed who presents with a femur fracture and progressive hemorrhagic shock.	In this scenario the nurses were challenged to care for the patient in a demanding environment (helicopter landing) without benefit of technology (ie, no blood pressure cuff). This scenario prepared the nurse to respond to similar injuries in an austere environment, such as during a disaster (eg, earthquakes). Additionally, this scenario provided a forum to discuss other injuries that may occur due to a bomb blast.
Burn Man: A crewman on the back of an aircraft hit by gunfire with subsequent fire. The airman presented with smoke inhalation/carbon monoxide (CO) poisoning and partial and full thickness thermal injuries.	In this scenario the nurses were required to implement a systematic burn plan, manually calculate intravenous drip rates, and coordinate transfer of the airman for definitive care.

war and from terrorist acts [2,3,6–17]. Table 3 describes the four scenarios.

Warskills Simulation Laboratory

The training and evaluation was conducted in the Nursing Warskills Simulation Laboratory, which was designed to recreate the field environment. The laboratory, which was located on a military field-training site, is located in a 10-foot by18-foot room covered with camouflage and sandbags (Fig. 5). The only lighting was from the portable lights used in military field tents. The equipment (defibrillator, ventilator, IV pump, liquid oxygen [PTLOX]) and type and quantity of supplies were consistent with those used in a deployed environment. The supplies were packed in fold out cases specifically designed for US Air Force medical teams (Fig. 6). To emphasize the need for supply discipline (eg, not every patient needs oxygen), as an item was used it was removed so that it was not available for future scenarios. A surround-sound stereo system was used to make the environment more challenging, for example, the sounds of a helicopter landing played while the nurse was trying to auscultate lung sounds. Finally, the laboratory was equipped with microphones and recording capabilities so that all training could be videotaped and the second instructor who was located in the control room (“the wizard”) could hear and see all the action in the laboratory. The wizard modified the mannequin’s responses so that there was a realistic “real time” response to the nurses’ interventions.

The centerpiece of the laboratory is a HPS (Medical Education Technologies, Sarasota FL) also known as “Stan.” Examples of Stan’s capabilities are outlined in Table 2. Stan, who is physiologically reactive, demonstrates real-time response to interventions by manifesting decompensation or intolerance to an intervention (eg, if hemorrhage is not controlled he progressively develops shock as manifested by a loss of pulses, tachycardia, decreased urinary output and mental status, or he can be made to “buck” the ventilator).

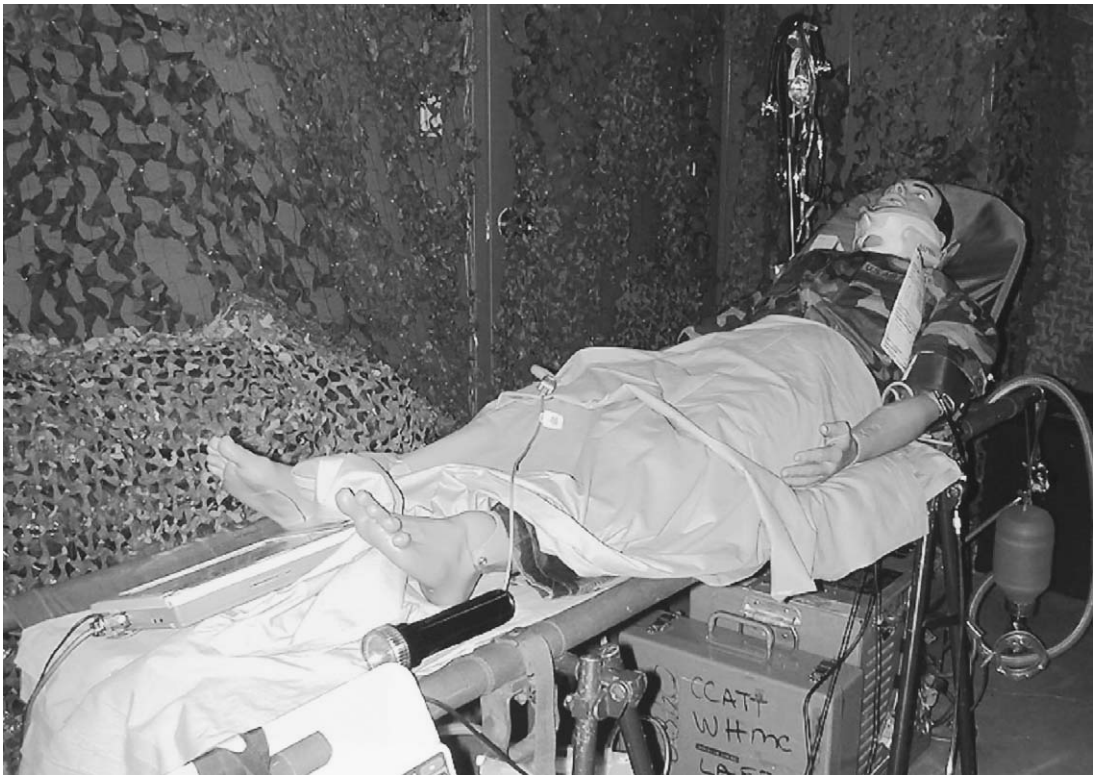

Fig. 5. The USAF Nursing Warskills simulation laboratory located at Wilford Hall Medical Center is equipped with a state-of the-art human patient simulator, aka ''Stan''. The laboratory has only the equipment available in a deployed setting, such as the PT LOX (box under the litter), which is the source of oxygen used in the field.

An example of Stan's realism occurred during an exercise in Alaska, which took place in a military field tent under freezing conditions. Stan was on a ventilator and a member of the team accidentally tripped over the supplemental oxygen hose supplying the ventilator. The only way the disconnection was detected was that Stan became hypoxemic and tachypneic and his pulse oximeter alarmed. The team had to troubleshoot the system and correct the problem.

Coaching techniques

During the simulation laboratory the instructors focus on developing the critical thinking skills of the nurses, which is essential in preparing nurses to care for patients in challenging environments. Characteristics of critical thinking and examples of questions used by the instructors to facilitate critical thinking are presented in Table 4 [18]. The instructors also coach the nurses on the use of a systematic approach to patient care based on the acronyms taught in the advanced trauma life support (ATLS) and the trauma nursing core course (TNCC). Finally, debriefing is conducted after each scenario to further aid the development of critical thinking. The goal of the debriefing is to reinforce the positive aspects of the experience and to encourage reflective learning, which allows the participant to ''link theory to practice, think critically, and intervene creatively and professionally in very complex situations'' [6 (p. 251)].

Simulation laboratory evaluation

Evaluation of the laboratory sessions in this study included an assessment of team performance (3 to 4 nurses per team), and each nurse completed a self-assessment of his or her ability to provide care using deployment unique equipment and supplies for the types of patients presented. Results from the

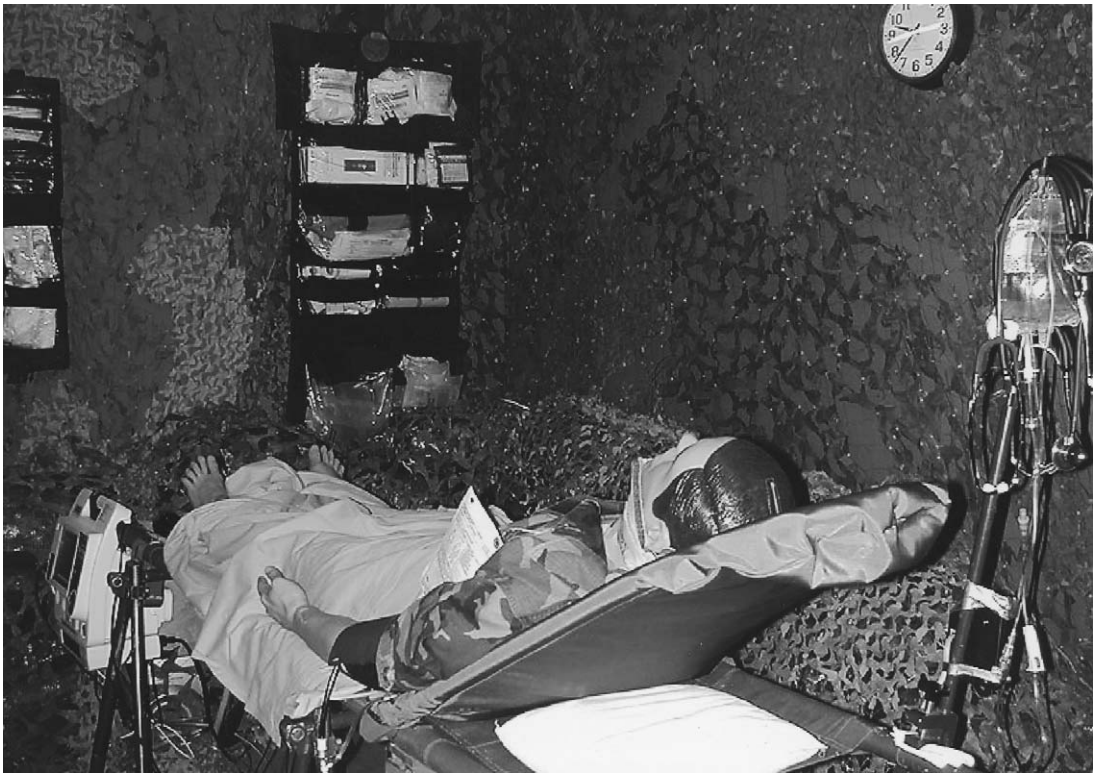

Fig. 6. USAF Nursing Warskills Simulation Laboratory. The equipment bags on the wall were specifically designed to meet the Air Force's need to have a lean, light, and mobile force. These bags are portable and allow the nurse to quickly visualize the availability of medications, supplies, and equipment.

initial training and evaluation phase of the study illustrated a tendency for the nurses to overestimate their capabilities when compared to their actual performance in the skills laboratory. Other results of interest were the need for additional training in the performance of a systematic assessment and history (ie, what events lead up to the injury), provision of patient care without technology (eg, assessing the blood pressure without a blood pressure cuff or manual calculation of an IV drip rate), the use of deployment specific equipment, and the need to plan ahead with regard to resources that would be useful during a deployment (eg, drug book and calculator). Further research is ongoing to determine the retention of these capabilities 6 or 12 months after training.

The nurses were asked to evaluate the simulation laboratory experience. *(1) What aspects of the simulation training contributed to your learning?* General comments focused on the ability to interact with Stan, the benefits of teamwork, and the use of a systematic process. Specific responses included: ''Seeing and hearing how others thought and handled scenarios, seeing the acronyms on the blackboard.'' ''Having a talking patient and working as a team.'' ''Seeing and hearing how others thought and handled scenarios.'' ''The ability to visualize the scene and touch/palpate. Also the opportunity to take time to think out loud and discuss as well as teamwork involved. Lastly, the instructor's reinforced experience.'' *(2) What aspects of simulation training detracted from your learning?* There were limited comments on aspects of simulation training that detracted from learning. Most of the comments focused on the uniqueness of the experience. Specific comments included: ''Just the newness of it and expecting the mannequin not to react.'' ''Maybe my feelings unfamiliar with the various injuries Stan presented, but this is a good way to learn.'' ''Anxiety —however that's life and you have to get beyond that.'' *(3) Other comments:* ''I really enjoyed it. It makes you feel a little more confident about

Table 4
Questions to facilitate critical thinking

Habits of mind	Questions
Contextual Perspective: consideration of the whole situation, including relationships, background and environment relevant to some happening	Why do you think this patient kept repeatedly asking the same questions? (A)
Creativity: Intellectual inventiveness used to generate, discover, or restructure ideas; imagining alternatives	How would you determine this patient's blood pressure if you did not have a blood pressure cuff? (P)
Intuition: Insightful sense of knowing without conscious use of reason	You triaged this patient as "delayed" —what led to that decision?
Reflection: Contemplation upon a subject, especially one's assumptions and thinking for purposes of deeper understanding and self-evaluation	What preparation do you think you might need if you were required to care for a patient with chemical or biological injury? (P)
Skills	**Questions**
Analyzing: Separating and braking a whole into parts to discover their nature, function, and relationship?	Where are you in the primary assessment (ABCs)? (A)
Applying Standards: judging according to established personal, professional or social rules or criteria	What data are you finding as you complete your assessment? How is this different from normal?
Discriminating: recognizing differences and similarities among things or situations and distinguishing carefully as to category or rank	How effective was the intervention? (E) How do you know if the antidote has been effective for this patient? (E)
Logical reasoning: drawing inferences and conclusions that are supported in or justified by evidence	Do you believe the pulse oximetry reading (for a patient with carbon monoxide poisoning)? (E)
Predicting: envisioning a plan and its consequences	What is this patient's trajectory? Now that you have decided what the problem is, what do you plan to do? (P)
Transforming knowledge: changing or converting the condition, nature, form, or function of concepts among concepts	How would you triage this patient if you had 20 other casualties? (I)

Key: A, assessment; P, planning; I, intervention; E, evaluation.
From Scheffer B, Rubenfeld M. A consensus statement on critical thinking in nursing. J Nurs Ed 2000;39:352–359; with permission.

your critical thinking and managing situations with limited resources." "I like the fact that the simulations were close to real-life situation (the dummy actually giving feedback)." "Group participation gave each person a means of learning without fear." "Very good to talk about what happened and what could have been done differently." "Patient going sour when you don't realize it." "I like Sgt Stan, very lifelike, equipment very new and will be seen on a true deployment." "Good to include burns — very real-life situation that we never see in our practice! Good to review chest tubes, head injuries. All was great!"

Cognitive examination

In addition to evaluation in the simulation lab, cognitive evaluation was conducted using a 172-item examination. The test questions were based on the most common injury patterns expected in peacetime and wartime operations, the equipment and supplies available, the frequency with which each skill or patient management scenario was performed in daily hospital-based care and the criticality of each of the skills. The boxed information provides an example of deployment specific test questions.

Examples of readiness specific test questions

1. You are deployed to Saudi Arabia. A flight line security guard collapsed. The patient is hot to touch with no sweat. His core temperature is 107°F. You are unable to auscultate a blood pressure. The following ECG strip was obtained.

The immediate action is to

A. Immerse the airman into an ice slurry to cool him down
B. Start CPR
C. Start an IV and begin aggressive volume resuscitation
D. Check his pulse

Key: D

2. You are deployed to support a wintertime exercise at a northern tier base. A flight line security guard presents with swelling of his fingers/toes with loss of function. The digits are pale white. A preliminary diagnosis of superficial frostbite is made. The most appropriate plan of treatment includes

A. Slowly rewarming the affected digits and return the airman to duty
B. Wrapping the affected extremities in dry heat rewarming pads
C. Rapidly rewarming the affected digits in a 100°F waterbath
D. Passively rewarming the digits and then debride any necrotic tissue

Key: C

3. A nurse is acting as the triage officer and more than 50 casualties from a terrorist bomb blast are expected. Supplies are extremely limited and your re-supply date is unknown.

- Patient 1 has abrasions and contusions
- Patient 2 has bilateral broken femurs with intact neurovascular status
- Patient 3 has deep partial and full thickness burns to face, hands, feet; and trunk; total BSA 60%

Place the first three patients in the most appropriate initial triage categories:

A. Patient 1, delayed; Patient 2, delayed; Patient 3, immediate
B. Patient 1, delayed; Patient 2, immediate; Patient 3, immediate
C. Patient 1, minimal; Patient 2, delayed; Patient 3, expectant
D. Patient 1, minimal, Patient 2, delayed; Patient 3, immediate

Key: C

Test results identified learning needs related to field management of ventilator and airway emergencies; hydration in malnutrition and severe dehydration; and patients with infectious diseases, combat stress, and chemical injuries. Based on these results, additional training has already been provided to the more than 500 nurses assigned to Wilford Hall Medical Center. The final results of this study will be provided to Air Force medical planners to inform future education and training.

Ongoing research

Revision of the cognitive examination is ongoing to remove or revise items that do not effectively discriminate between nurses who can/cannot effectively care for a patient in the deployed environment. Additionally, the examination is being converted and analyzed in a web-based format so that the nurses can test on-line and receive immediate feedback. Research is also ongoing to determine the frequency

of training requirements (eg, every 6 months or 12 months), if there are differences in performance based on previous participation in educational opportunities (ACLS, TNCC) or deployment experience, and if there are different education and training requirements based on the unit of assignment (inpatient versus outpatient).

Warskills Simulation Laboratory discussion

With the exception of ocular trauma, the scenarios presented in this research represent the most common types of injuries observed in military operations such as Operation Just Cause (Panama), Enduring Freedom (Somalia), and Desert Shield/Desert Storm terrorist acts including the bombing of the Marine Corps Barracks in Beirut, the Air Force barracks at Khobar Towers, the Murrah Federal Building in Oklahoma City, the US Embassies in Kenya and Tanzania, and the USS Cole [2,3,7–17,19]. Further education and training is being developed on the management of injuries from landmines or explosive devices, a common cause of injury in wartime. Lastly, in response to current chemical-biologic threats, Stan is being upgraded to exhibit signs/symptoms of chemical-biologic exposure. These upgrades will be used to facilitate research to determine the most effective method to train nurses to care for these victims.

Summary

Injuries related to the events of September 11, 2001, and continuing military actions associated with Operation Enduring Freedom underscore the accurate focus of the Joint Trauma Training Center and the Warskills Simulation Laboratory. These two programs ensure that nurses are prepared to respond to diverse medical situations worldwide. Outcome measures from both initiatives attest to the effectiveness of an integrated program that facilitates critical thinking skills and clinical judgment to increase the nurses' ability to provide trauma care to severely injured military personnel.

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